

$\eta = 1-50$
 $M = H, OH, XR,$
Halogen, N_3

FIG. 1A

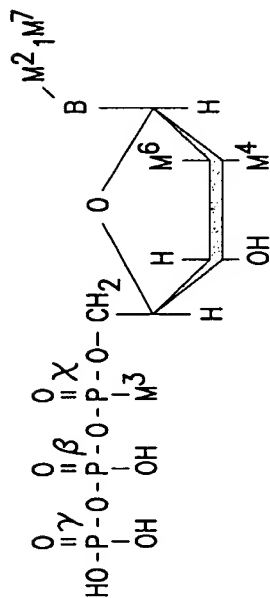


	M ¹	M ²	M ³	M ⁵
Type Ia (base modified DNA)	OH	XR/Hal	OH	H
Type Ib (base modified RNA)	OH	XR/Hal	OH	OH
Type IIa (5'– modified DNA)	XR/Hal	H	OH	H
Type IIb (5'– modified RNA)	XR/Hal	H	OH	OH
Type III (3'– modified)	OH	H	OH	XR/Hal
Type IVa (P– modified DNA)	OH	H	XR	H
Type IVb (P– modified RNA)	OH	H	XR	OH

FIG. 1B



Nucleoside Triphosphate Elongators:



Nucleoside Triphosphate Terminators:

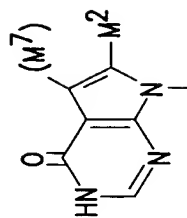
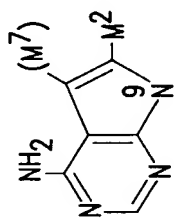
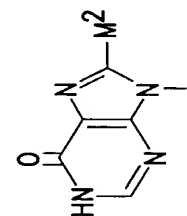
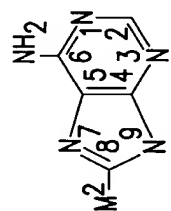
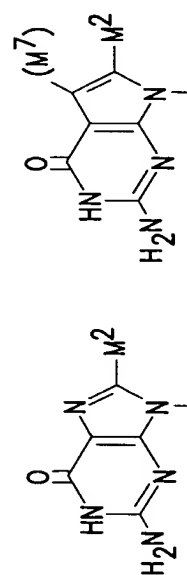
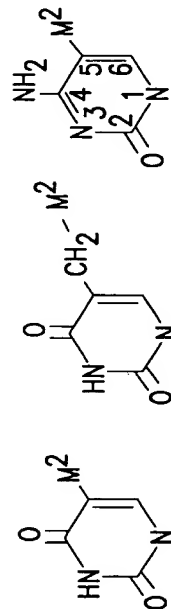
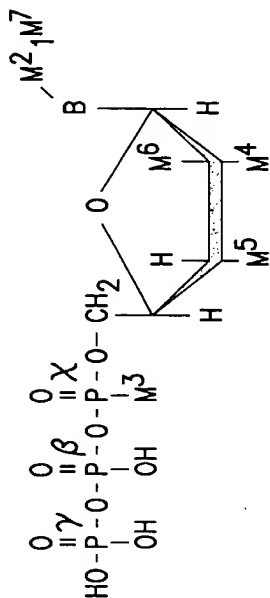


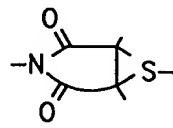
FIG. 2A



	M ²	M ³	M ⁴	M ⁵
Type A (DNA-Termination)	XR	OH	H	H
Type B (DNA-Termination)	H	OH	H	XR
Type C (DNA-Termination)	H	XR	H	H
Type D (RNA-Termination)	XR	OH	OH	H
Type E (RNA-Termination)	H	OH	OH	XR
Type F (RNA-Termination)	H	XR	OH	H

FIG. 2B



X	R
$-O-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-O-\overset{\overset{O}{\parallel}}{C}-(CH_2)_r-\overset{\overset{O}{\parallel}}{C}-O-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-NH-\overset{\overset{O}{\parallel}}{C}-/-\overset{\overset{O}{\parallel}}{C}-NH-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-NH-\overset{\overset{O}{\parallel}}{C}-(CH_2)_r-\overset{\overset{O}{\parallel}}{C}-O-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-NH-\overset{\overset{S}{\parallel}}{C}-NH-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-O-\overset{\overset{O}{\mid}}{P}-O-Alkyl$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-O-SO_2-O-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-O-\overset{\overset{O}{\parallel}}{C}-CH_2-S-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-S-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$
$-NH-$	$-(CH_2CH_2O)_m-CH_2CH_2-OH$ or $-(CH_2CH_2O)_m-CH_2CH_2-O-Alkyl$

$m = 0, 1-200$
 $r = 1-20$

FIG. 3



-H

Alkyl: $-(CH_2)_r-CH_3$ e.g. $-CH_3, -C_2H_5$,
and branched e.g. $-CH(CH_3)_2$

$ICH_2(CH_2)_r-O-H$

2,3-Epoxy-I-propanol

$-(CH_2)_m-CH_2-O-H$

$-(CH_2)_m-CH_2-O-Alkyl$

$-(CH_2CH_2NH)_m-CH_2CH_2-NH_2$

$-\left[\begin{array}{c} \text{NH}-(CH_2)_r-\text{NH}-\text{C}(=\text{O})-(CH_2)_r-\text{C}(=\text{O}) \end{array} \right]_m-\text{NH}-(CH_2)_r-\text{NH}-\text{C}(=\text{O})-(CH_2)_r-\text{C}(=\text{O})-\text{OH}$

$-\left[\begin{array}{c} \text{NH}-(CH_2)_r-\text{C}(=\text{O}) \end{array} \right]_m-\text{NH}-(CH_2)_r-\text{C}(=\text{O})-\text{OH}$

$-\left[\begin{array}{c} \text{NH}-\text{CHY}-\text{C}(=\text{O}) \end{array} \right]_m-\text{NH}-\text{CHY}-\text{C}(=\text{O})-\text{OH}$

$-\left[\begin{array}{c} \text{O}-(CH_2)_r-\text{C}(=\text{O}) \end{array} \right]_m-\text{O}-(CH_2)_r-\text{C}(=\text{O})-\text{OH}$

-S-

-Si (Alkyl)₃

-Halogen

-N₃

$-CH_2F, -CHF_2, -CF_3$

$m = 0, 1-200$

$r = 1-20$

FIG. 4

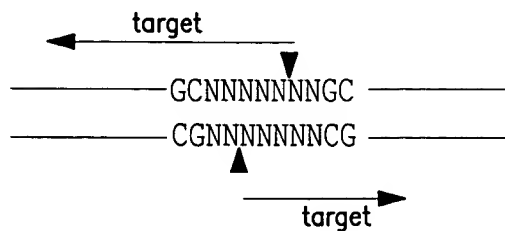
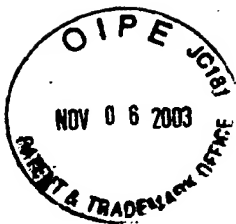


FIG. 5

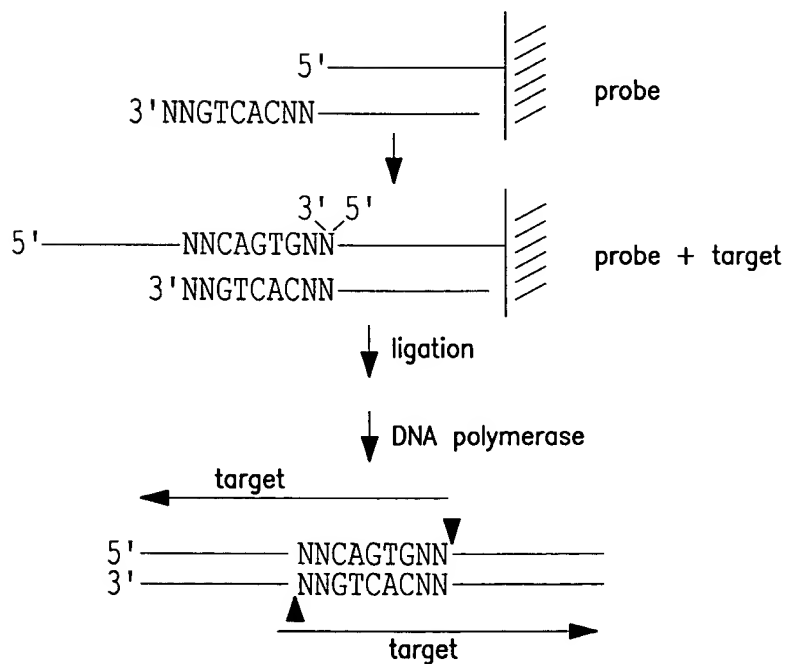


FIG. 6



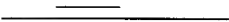
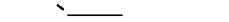




Nucleic Acid Structure	Calculated T_m ($^{\circ}\text{C}$, average base composition)			
	n= 8	7	6	5
	38	33	25	15
	33	25	15	3
	25	15	3	-14
	51	46	40	31
	46	40	31	21
	40	31	21	11

FIG. 7

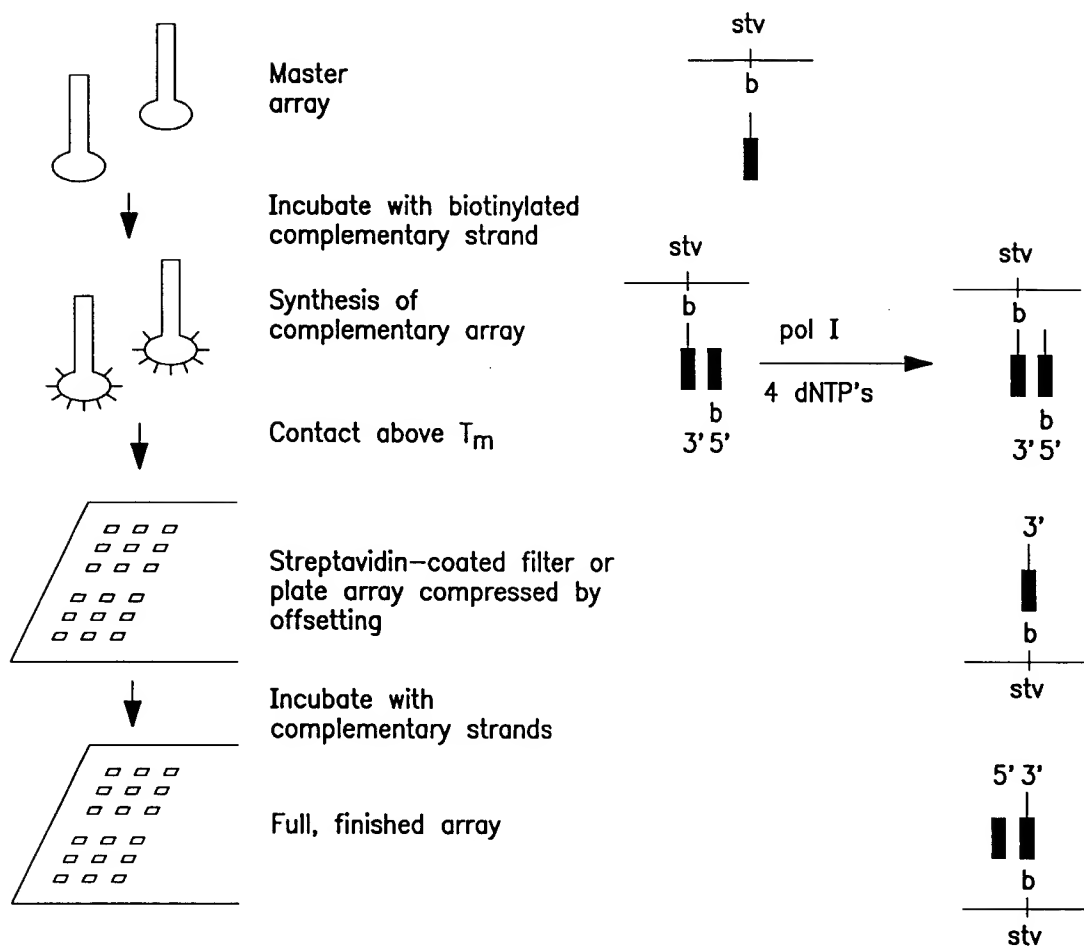


FIG. 8

Reaction Scheme for the Covalent Attachment of DNA to a Surface

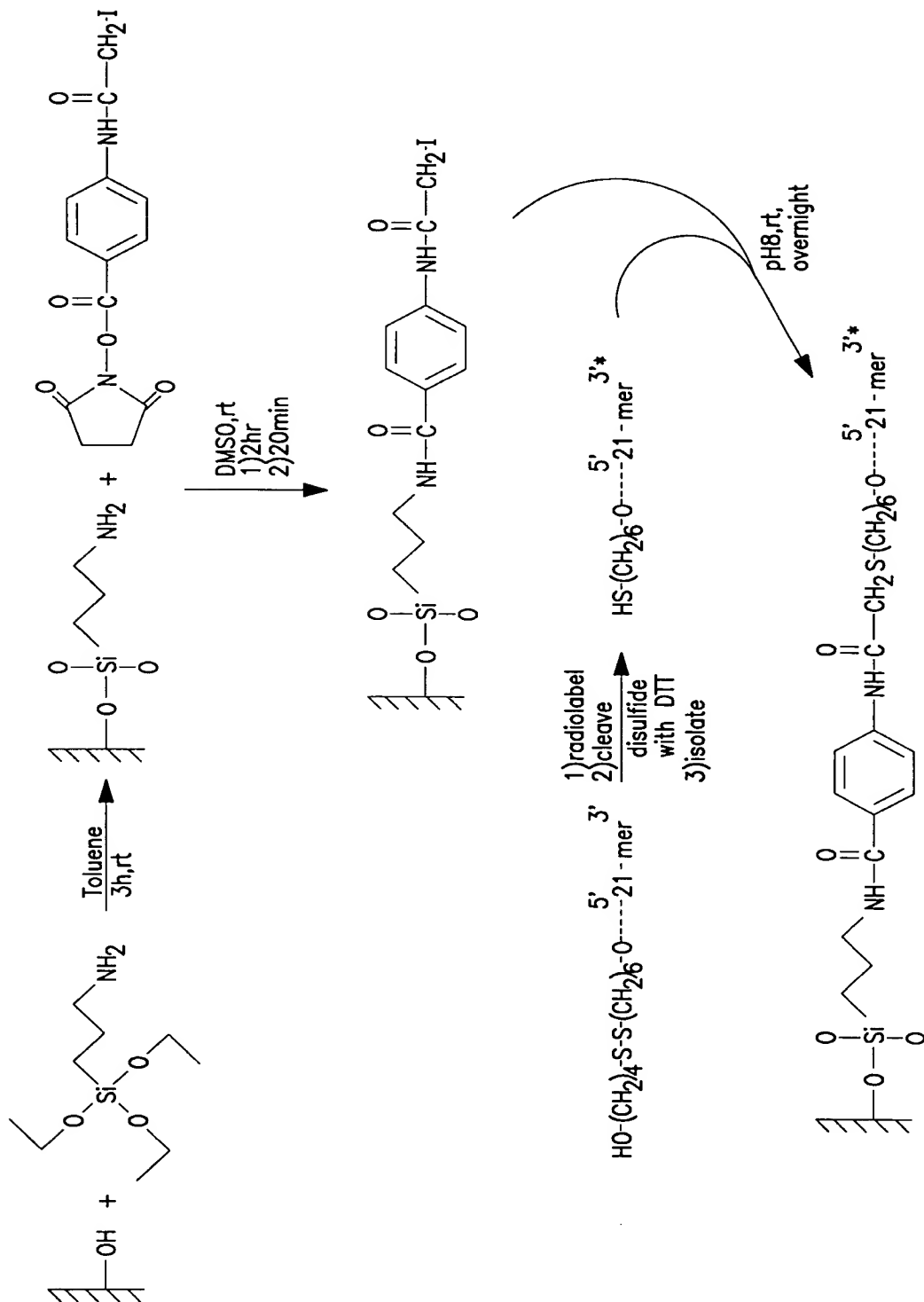


FIG. 9



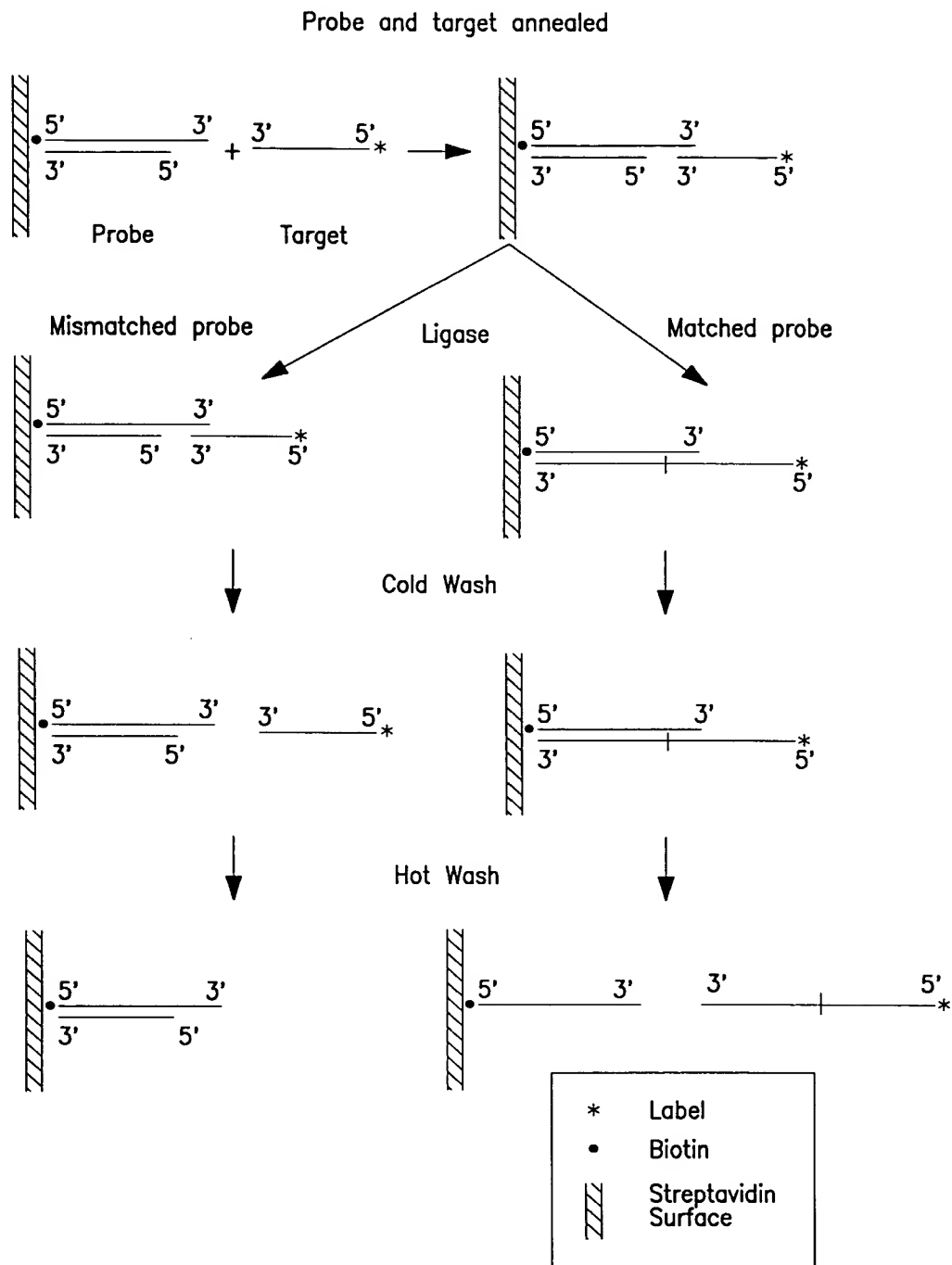


FIG. 10

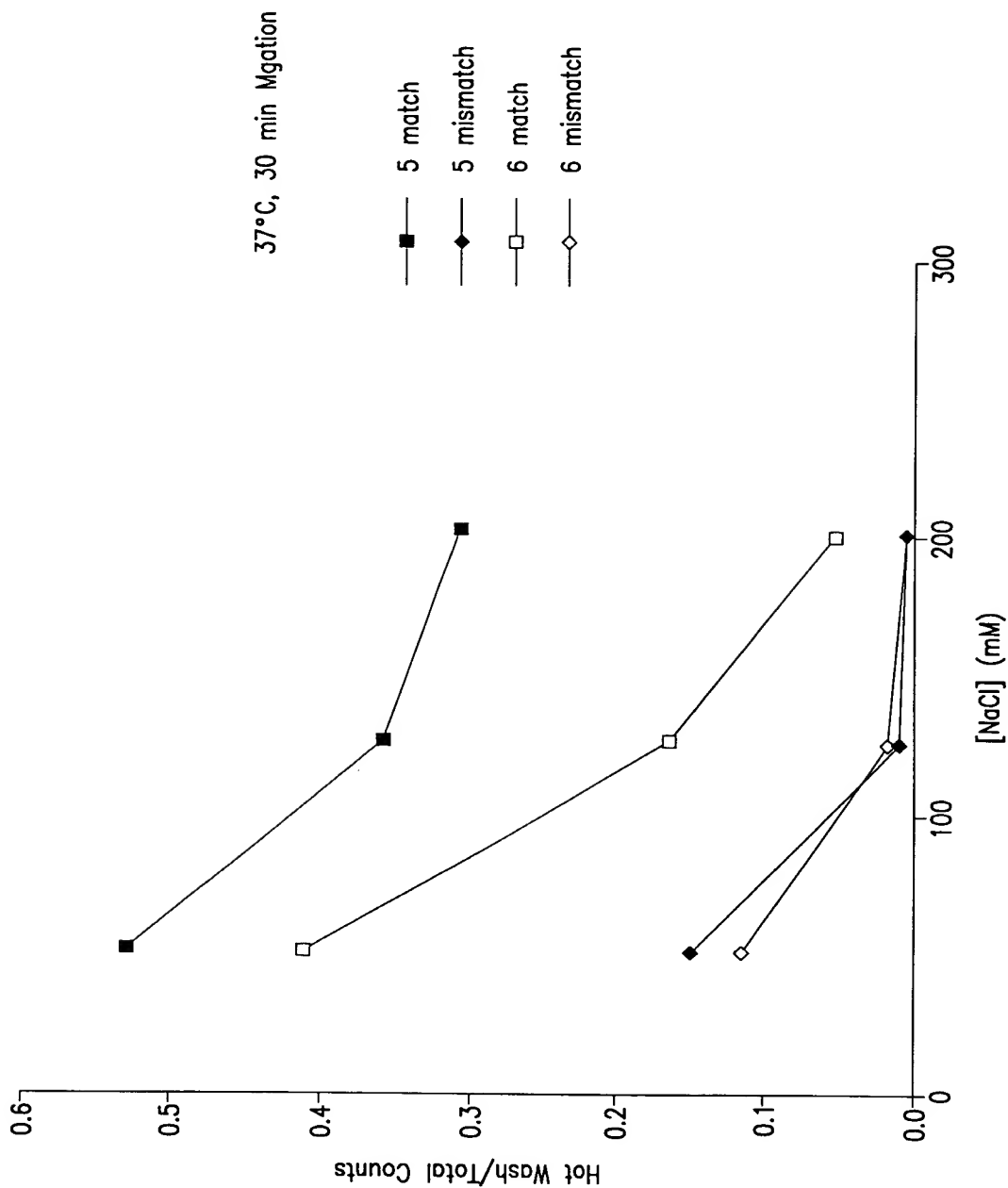
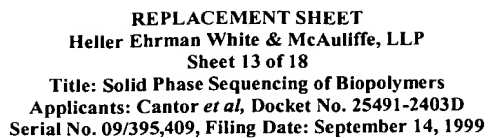
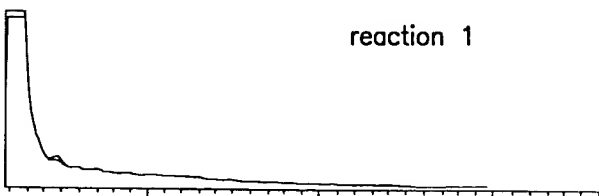


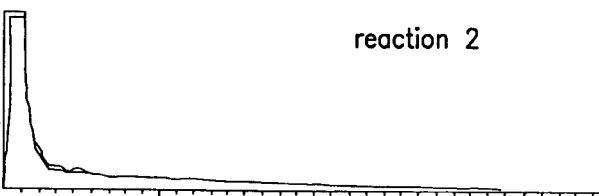
FIG. 11





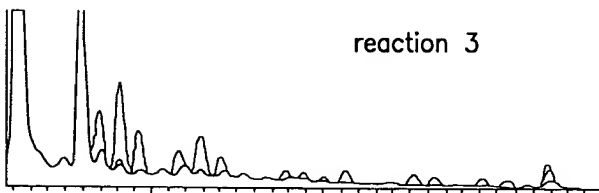
reaction 1

FIG. 13A



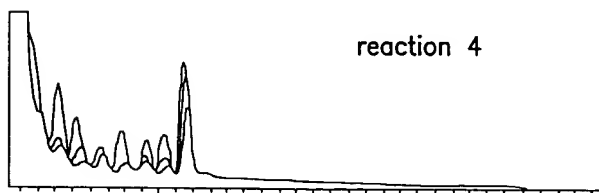
reaction 2

FIG. 13B



reaction 3

FIG. 13C



reaction 4

FIG. 13D

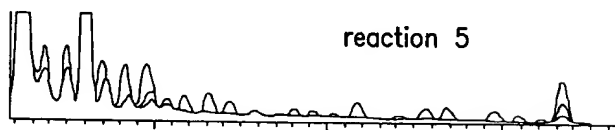


FIG. 13E

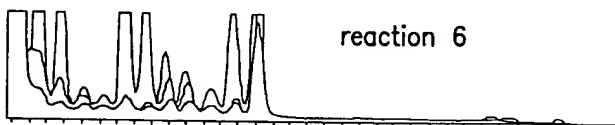


FIG. 13F

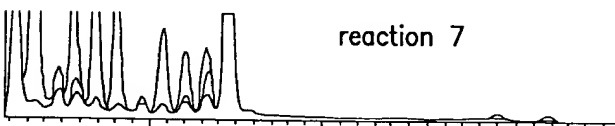


FIG. 13G

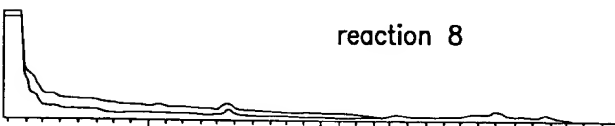


FIG. 13H

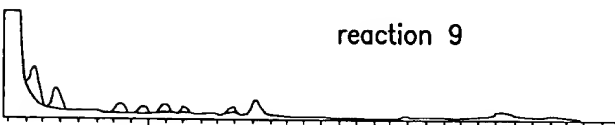


FIG. 13I

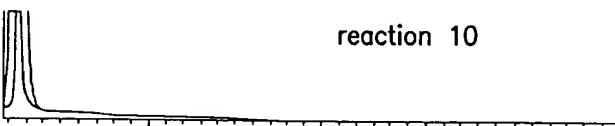


FIG. 13J

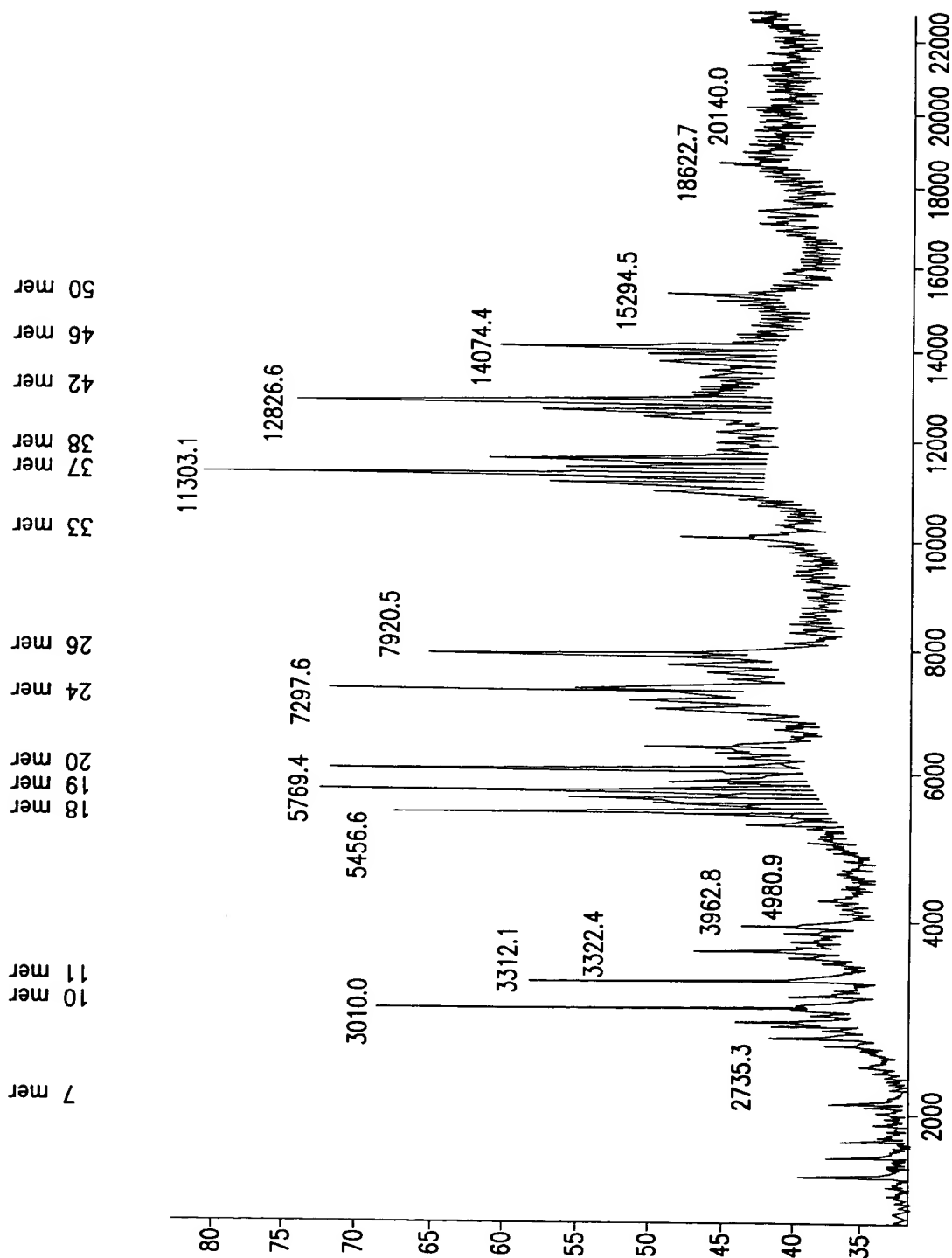


FIG. 14

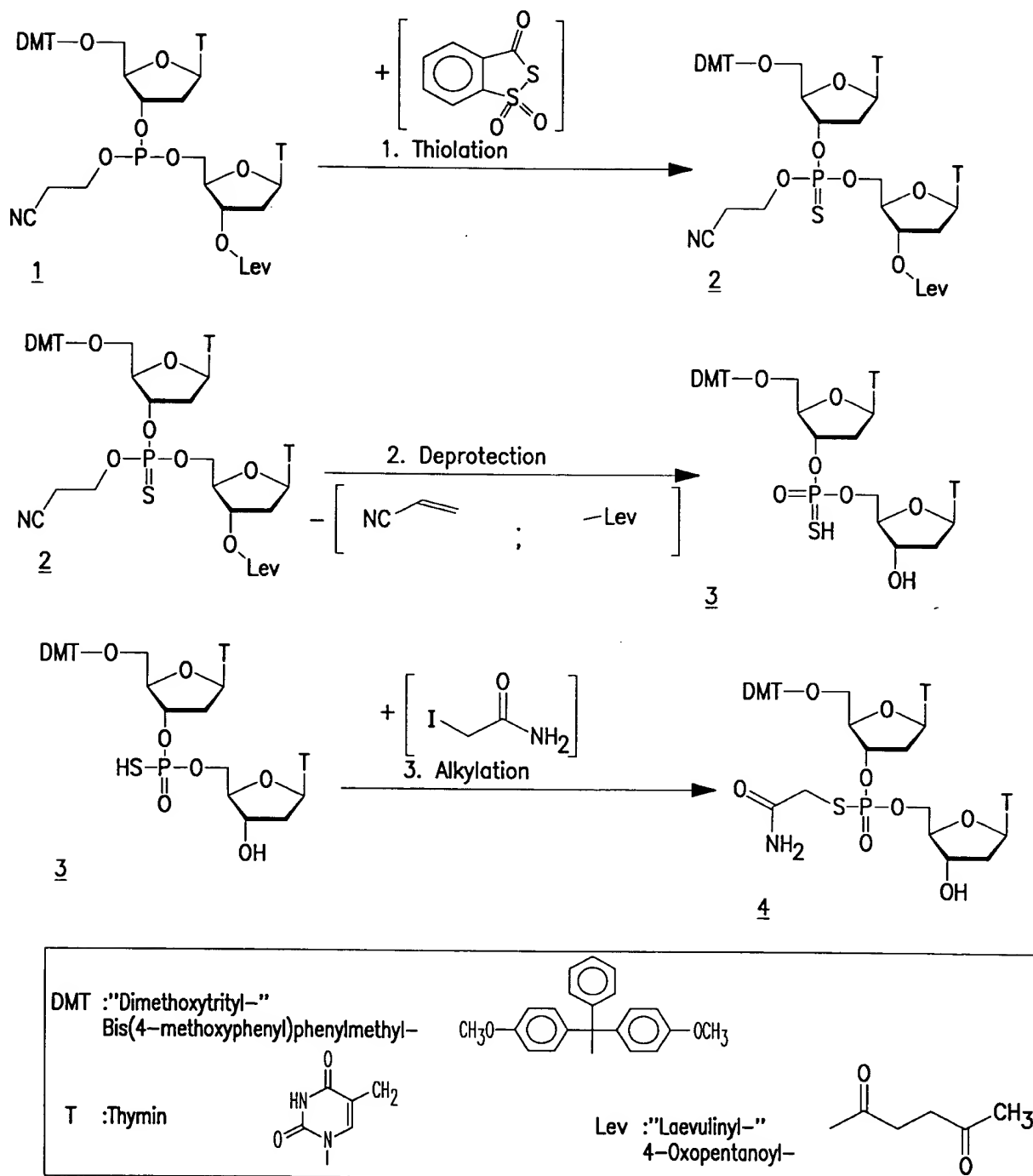


FIG. 15

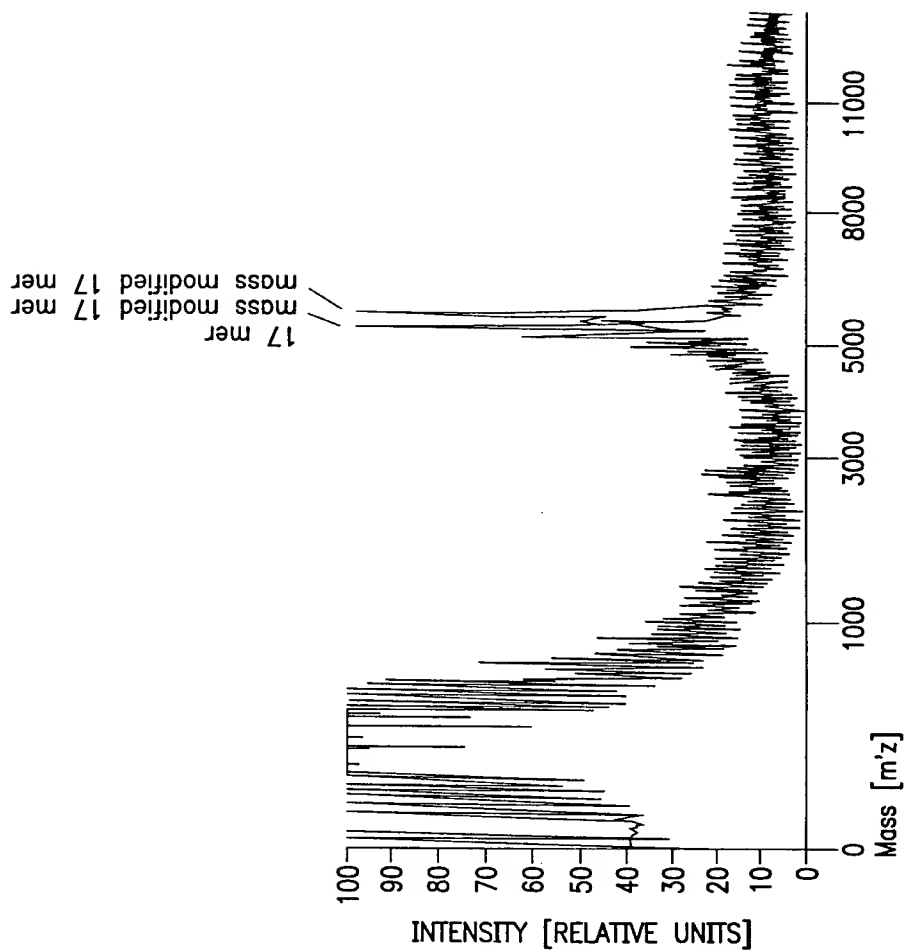


FIG. 16